

[| NODIS Library](#) | [Legal Policies\(2000s\)](#) | [Search](#) |

NASA Procedural Requirements

NPR 2570.1

Effective Date: April 24, 2003

Expiration Date: April 24,
2008**COMPLIANCE IS MANDATORY**[Printable Format \(PDF\)](#)

Subject: NASA Radio Frequency (RF) Spectrum Management Manual

Responsible Office: Space Operations Mission Directorate

[| TOC](#) | [Preface](#) | [Chapter1](#) | [Chapter2](#) | [Chapter3](#) | [Chapter4](#) | [Chapter5](#) | [AppendixA](#) |
[AppendixB](#) | [AppendixC](#) | [AppendixD](#) | [AppendixE](#) | [AppendixF](#) | [AppendixG](#) | [AppendixH](#) |
[AppendixI](#) | [AppendixJ](#) | [AppendixK](#) | [ALL](#) |

Appendix F: NTIA Systems Review and NTIA Space Systems Subcommittee (SSS)

Details of the NTIA Systems Review process can be found in the NTIA Manual Chapter 10. Note also section 1.2 of this NPG. Briefly, the procedure consists of a four-stage review performed in the NTIA Spectrum Planning Subcommittee (SPS) Systems Review branch as described below. Note that this review process is mandatory for space systems except those that operate under Annex K of the NTIA Manual regarding low power nonlicensed devices.

All data must be submitted to the NASA SPS Representative in accordance with paragraph 10.7 and on the following forms found in chapter 10 of the NTIA Manual:

NTIA Form 33 Transmitter equipment characteristics;

NTIA Form 34 Receiver equipment characteristics; and

NTIA Form 35 Antenna equipment characteristics.

Stage 1 Conceptual

Here the initial planning effort has been completed, including proposed frequency bands and other available characteristics.

The Stage 1 Systems Review addresses the certification of spectrum support for telecommunication systems or subsystems and provides guidance on the feasibility of obtaining certification of spectrum support at subsequent stages. Those systems or subsystems that have a major impact on spectrum usage as defined by user agencies, IRAC, or NTIA, especially those that use new technological concepts or use existing technology in significant new ways, should be submitted. The guidance provided will indicate any modification, including more suitable frequency bands, necessary to ensure conformance with the Tables of Frequency Allocations and the provisions of chapter 5 {Spectrum Standards} of the NTIA Manual.

Because much of the system data will be estimated, in analyses performed by the SPS Systems Review Branch leading to certification of spectrum support, only gross calculations may be achievable for a general evaluation of spectrum impact and will be subject to adjustment during later stages. The system will be reviewed in conformance to International and National Allocation Tables. In addition, checks will be made against existing standards and sharing criteria, comparison will be made with known similar systems, and spectrum efficiency will be considered.

Note that with Stage 1 approval, the Agency, may not apply for a temporary frequency assignment. Temporary frequency assignments are available after Stage 2 SPS approvals and above.

Stage 2 Experimental

Here the preliminary design has been completed, and radiation, using test equipment or preliminary models, may be required.

Information identified in the Stage 1 Systems Review should be enhanced to make it current. Along with this, information required by Appendix S4 of the ITU RR shall be furnished to the SSS in accordance with the instructions in the current Manual of Instructions and Procedures for Notifying US Radio Frequency Assignment Data to the Radio Regulations Board (RRB). This data may be used in lieu of the data required for Stage 1 or 2 Systems Review request. The Appendix S4 data shall be provided to the SSS at the same time as the request for Stage 2 Systems Review and shall not normally be transmitted to the RRB for advance publication until Stage 2 Certification of Spectrum Support has been granted.

The Advance Publication Information should be submitted not earlier than 6 years and preferably not later than 2 years before bringing the frequency assignments into use. There is no minimum time period but as a practical matter if coordination and/or agreement are required, the information should be submitted at least 2 years before bringing the frequency assignments into use.

The RR require information for each "satellite network," e.g., a satellite "system" or part thereof consisting of "only one satellite and the co-operating Earth station(s)" or in the case of inter-satellite links, "the associated satellite network." The information on a multi-satellite system should, where possible, be furnished to the RRB in separate parts, each corresponding to a satellite network.

In the case of a geostationary satellite system, there is no difficulty in singling out each network.

In the case of a nongeostationary satellite system, an operator may find it difficult to single out one satellite (and its cooperating Earth stations) from the system in order to assign an identity to the network. One system may be composed of two satellites, one of which is working while the other is idle. Another system may be composed of a large number of satellites operating simultaneously. Thus, according to the type of nongeostationary satellite system involved, it may be difficult or even impossible to draw a distinction between network and system. In order to distinguish between the different networks of such a nongeostationary satellite system, it is often necessary to specify factors such as the satellite's orbit, the nature of the service to be provided, the coverage area on the Earth's surface, and the daily hours of operation, which would lead to unwarranted complications.

Unless the Agency can easily break down the satellite system into separate networks, the identity of the entire nongeostationary satellite system should be entered and information on the whole system should be furnished.

Certification of spectrum support for telecommunication systems or subsystems at Stage 2 is a prerequisite for NTIA authorization of radiation in support of experimentation for space systems. It also provides guidance for ensuring certification of spectrum support at subsequent stages. Certification at Stage 2 may be requested for test equipment modified operational equipment or initial design models that can be used to determine which of several frequency bands or which of several proposed equipment configurations should be selected for continued investigation.

In the review leading to certification of spectrum support at Stage 2, an evaluation of the system conformance to NTIA Manual Chapter 5, Spectrum Standards, is performed along with an assessment of the system usage for war emergencies and verification that Appendix S4 of the ITU RR is satisfied. A general analysis will be applied by the SPS, where appropriate, with more specific Electromagnetic Compatibility (EMC) analysis, against a typical environment, being added where experimental testing of technically defined equipments is involved. Recommendations for changes to equipment characteristics and contemplated operational employment and deployment will be provided, when appropriate. Calculations required in connection with national and international space coordination procedures in accordance with the methods of Appendices 28 and 29 of the ITU RR will be performed to the extent practicable.

After the SPS Stage 2 review is approved, the Agency may forward a request to the FAS to obtain the necessary frequency assignment. See section 3.3 of this NPG. At this stage, the frequency assignment request should be for a trial assignment for the location at which the system will be tested. A planning assignment may also be applied for in anticipation of the operational {Stage 4} approval.

Stage 3 Developmental

Here the major design has been completed and radiation may be required during testing.

For the Stage 3 Systems Review, the Agency must update the information already provided and include as a minimum:

- (1) For each Earth station transmitter and receiver site:
 - (a) Frequencies or frequency bands and satellites to be accessed;
 - (b) Coordinates;
 - (c) Emission designator for each frequency or frequency band;
 - (d) Maximum spectral power density and output power for each frequency or frequency band;
 - (e) Lowest equivalent satellite link noise temperature and associated value of transmission gain for each frequency

or frequency band (geostationary satellites with simple frequency changing transponders only);

- (f) Antenna gain and beamwidth;
- (g) Minimum elevation angle of antenna main beam;
- (h) Range of azimuth angles, and
- (i) Lowest total receiver noise temperature (when (e) is not appropriate).

(2) For each space station transmitter and receiver:

- (a) Frequency or frequency bands and cooperating Earth stations;
- (b) Satellite orbital information;
- (c) Emission designator for each frequency or frequency band;
- (d) Peak power and spectral power density for each frequency or frequency band for transmitters;
- (e) Receiver noise temperature, and
- (f) Transmitter antenna patterns (only if power flux density limits are exceeded).

Following receipt of these data, the SPS will initiate the Stage 3 Systems Review. Certification of spectrum support for telecommunication systems or subsystems at Stage 3 is a prerequisite for NTIA authorization of radiation in support of developmental testing for systems that are subject to these procedures. It also provides guidelines for assuring certification of spectrum support at Stage 4. At this point, the intended frequency band will normally have been determined and certification at Stage 3 will be required for testing of proposed operational hardware and potential equipment configurations.

Detailed EMC analyses will be performed using test data and considering specific sites of equipment. A radiation hazard evaluation will be performed using Occupational Safety and Health Administration (OSHA) Operation of Exposure Limits ANSI-C95.1-1982 as the standard. Appropriate recommendations as to equipment characteristics or operational deployment will be developed. Calculations in connection with national and international space system coordination procedures will be performed or updated as appropriate.

After the Stage 3 approval, the Agency, through the FAS representative, should apply for or upgrade a temporary frequency assignment. This also applies to any planning assignments extant.

Stage 4 Operational

Here development has been essentially completed, and final operating constraints or restrictions required to ensure compatibility needs to be identified.

When submitting for Stage 4 Systems Review, NASA must update all previous information provided.

Certification of spectrum support for telecommunication systems or subsystems at Stage 4 is a prerequisite for an NTIA RFA for a station with an operational station class (i.e., other than experimental) for systems that are subject to these procedures. Both the Stage 4 Certification of Spectrum Support and the RFA may provide restrictions on the operation of the system or subsystems as may be necessary to prevent harmful interference.

In analyses leading to certification of spectrum support at Stage 4, detailed EMC analyses will be updated by the submitting Center, as required, to include consideration of frequency assignments for specific system deployment. Appropriate recommendations as to equipment characteristics and/or operational limitations will be provided. Having completed the SPS review process, application may be made by the Agency, through the FAS Representative, for an operational frequency assignment.

NTIA Space Systems Subcommittee

The SSS of the IRAC will review the information provided by the Agency prior to initiating the international coordination and notification process through the ITU.

For unclassified space systems that have not been waived from the requirements of international registration, information must be prepared in specific formats and submitted to the SSS in accordance with instructions in the Manual of Instructions and Procedures for Notifying U.S. Radio Frequency Assignment Data to the Radio Regulations Board. These data, required by the SSS to satisfy the specifications in Appendix S4, Advanced Publication, and formerly Appendix 3, request for coordination and notification of the ITU Radio Regulations, shall be submitted at the same time as the Stage 3 Systems Review requests and may be used in lieu of the data required for Stage 3 and 4 Systems Review requests. Appendix 3 has been replaced by the newer requirements of

Appendix S4.

In analyses leading to certification of spectrum support, an evaluation of the required submission of information according to Appendix S4 of the ITU Radio Regulations will be performed.

Submission of Information to the ITU

Notification of Frequency Assignments

Frequencies assigned to Government radio stations shall be notified to the International Frequency Registration Board (IFRB) in Geneva, Switzerland, as specified in the "[Manual of Instructions for Notifying U.S. Radio Frequency Assignment Data to the BR \(Radiocommunications Bureau\), Geneva, Switzerland.](#)"

Provision of Information Regarding Satellite Networks in Planned Satellite Systems

In order to ensure compliance with the provisions of Section I, Articles 8, 11, 13 and 14 of the ITU RR, any Government agency intending to establish a satellite system shall provide to the SSS the details contained in Appendix S4 to the ITU RR for each satellite network within the planned satellite system, including changes in the technical characteristics and the employment and deployment of stations contained therein.

The information in Appendix S4 of the ITU RR shall be furnished to the SSS in accordance with the instructions appearing in Chapter 10 of the NTIA Manual. The information in Appendix S4 shall be furnished to the SSS in accordance with the instructions in the current Manual of Instructions for Notifying U.S. Radio Frequency Assignment Data to the IFRB.

The Appendix S4 data shall be provided to the SSS at the same time as the request for Stage 2 Systems Review under chapter 10 of the NTIA Manual and shall not normally be transmitted to the BR for advance publication until Stage 2 certification of Spectrum Support has been granted or earlier if sufficient information is available.

The information in Appendix S4 shall be furnished to the SSS in accordance with the instructions in the current Manual of Instructions for Notifying U.S. Radio Frequency Assignments Data to the IFRB. The Appendix S4 data shall be provided at the same time as the Stage 3 Systems Review approval request under chapter 10 of the NTIA Manual. After Stage 3 approval, the required coordination will be initiated. Notification of frequency assignments to the BR will be made after Stage 4 approval has been granted and any required coordination has been accomplished. Operational frequency assignments will not normally be granted until notification has been initiated.

Before Stage 2, 3, or 4 support is granted the SSS must indicate that the appropriate Appendix S4 data have been submitted and reviewed if required by the SPS. The SSS will review the information and:

- (a) May notify the SPS that the required data are on file, and
- (b) Submit data to the FCC.

It is recognized that the submission of information to the BR concerning Earth stations located outside the jurisdiction of the United States may be the responsibility of the country on whose territory the Earth station is located.

As a matter of policy, advance publication information and notices of frequency assignments relating to space systems shall be submitted to the BR. Exceptions to this policy will be made only by the NTIA on a case-by-case basis.

[TOC](#)	[Preface](#)	[Chapter1](#)	[Chapter2](#)	[Chapter3](#)	[Chapter4](#)	[Chapter5](#)	[AppendixA](#)
[AppendixB](#)	[AppendixC](#)	[AppendixD](#)	[AppendixE](#)	[AppendixF](#)	[AppendixG](#)		
[AppendixH](#)	[AppendixI](#)	[AppendixJ](#)	[AppendixK](#)	[ALL](#)			

| [NODIS Library](#) | [Legal Policies\(2000s\)](#) | [Search](#) |

DISTRIBUTION: **NODIS**

This Document Is Uncontrolled When Printed.

Check the NASA Online Directives Information System (NODIS) Library
to Verify that this is the correct version before use: <http://nodis3.gsfc.nasa.gov>
